

3.3 Batch Mode

The ESPADP batch mode allows the user to process a large number of data files without entering settings in the GUI

A full complement of accumulation settings can be specified in a batch file and invoked with the "-batch" option. Output from the batch mode is in the form of gif files and ASCII text files.

This section describes how to operate ESPADP in batch mode.

3.3.1 Running Batch Operations

To run ESPADP with a batch file enter:

```
ens -p espadp -I <batch_filename> -o <output_filename>
```

where batch_filename is the name of the input file to use with ESPADP (described below)
output_filename is the file to contain the diagnostic output from the ESPADP run

The input file must be in the directory \$(ens_input)/espadp and the output file is written to \$(ens_output)/\$(LOGNAME).

3.3.2 Instructions

This section is intended to provide step-by-step instructions for a first time user to construct an ESPADP batch file. All commands and actions, indicated in **bold**, are described in sections 3.3.5 and 3.3.6.

Step 1: Determine the Types of Output Desired

This step can best be performed by running the ESPADP program interactively and producing the plots and tables that are available. Then select the plots and tables you would like to produce.

Step 2: Set the Time Window of the Analysis

This step consists of deciding on the total length of the analysis window and, once decided, calling the commands **StartDate**, **EndDate** and **ExceedProbDate** to setup the dates.

Step 3: Set the Time Step of the Analysis

This step consists of deciding on the time step used to break down the analysis window and, once decided, calling the command **Interval** to setup the time step. Common intervals include "6hours", "1day" and "1week".

Step 4: Set How the Data is to be Accumulated and Displayed

This step consists of deciding how you want to accumulate and display the data and, once decided, calling the commands **AccumVar** and **VarTyp** to set up the accumulation.

Step 5: Set Other Data Options

This step consists of setting values for other options that may or may not be needed, depending on the desired output, by calling the commands **ProbLevels**, **FloodLevels**, **YearWeight** and **Distribution**. **ProbLevels** only plays a role in the probability histogram plots and forecast information tables.

FloodLevels is only used in the **Flood Exceedance Probabilities Plot**. **YearWeight** affects all plots and tables, but is typically not needed for analysis unless you are attempting to account for long range CPC precipitation forecasts. **Distribution** plays a role in the plots and the forecast information table.

Step 6: Set the Display Options

This step consists of setting parameters for the plot displays and by calling the commands **RatingCurve**, **FloodStage**, **Units**, **Yaxis**, **LowFlow Value** and **LowFlowText**. The commands **RatingCurve**, **FloodStage**, **Units**, and **Yaxis** have a default value, but if you do not prefer the Default Value, then you need to override it by calling the appropriate command prior to any Plot action. The commands **LowFlowValue** and **LowFlowText** do not have a default value.

Step 7: Build the ESP Time Series Groups

This step consists of building the list of groups which you intend to analyze by calling the commands **ClearGroups**, **ESPTSDir**, **AddGroup** and **AddCalbFile**. ESPADP will execute each action given in the batch file for each ESP time series group in the list of groups. Each set of groups added should be preceded by calling **ClearGroups** to eliminate the previously defined list of groups, unless you want to keep that list. Then, each group is added by calling **AddGroup**, possibly preceded by **ESPTSDir**, if the files associated with that group are not in the current **ESPTSDir** directory. Finally, if you have datacard format files that are not associated with a group (i.e. are not OBS files), then you can add these by calling **AddCalbFile**.

Step 8: Set Plot Labels

This step consists of setting plot labels for any plot produced by calling one or more of the **Text** commands. Note that any change made to a label will appear in all plots, so that if you have a list of groups consisting of multiple forecast locations, then it may not be appropriate to force a label to have a specific forecast location identifier mentioned in it.

Step 9: Call Any Desired Actions

This step consists of calling actions that correspond to each of the desired outputs from step 1. The possible actions are **Plot**, **Table**, **PunchDataCard** and **PunchMeanDataCard**.

3.3.3 Batch File Format

Each line of the batch file corresponds to a command or a parameter setting. All lines must be of the format:

```
<token> = <value>
```

and have the following restrictions:

1. Tokens are not case sensitive.
2. Any number of spaces or tabs may be placed before or after the token and before or after the value.
3. A space, new-line (carriage return), tab, or pound ("#") marks the end of a value or token.
4. Double quotes must be placed around the value if it is to contain tabs, spaces, or pounds, but the value may never contain a new-line. For example,

```
my_name = hank herr
```

has a token of "my_name" and a value of "hank", whereas
my_name = "hank herr"

has a token of "my_name" and a value of "hank herr". If a new-line is encountered, it is treated as the closing double-quote.

5. The character "#", unless it is within double quotes, is used to denote a comment. Any characters after a # are ignored, meaning that a # marks the end of a line.
6. The equal sign ("=") should not be used as part of a value. For all practical purposes, it is treated as a space when extracting the value.

If a line is found which does not follow this format or if the line is blank, it will be ignored.

3.3.4 Definitions

This section provides definitions used throughout this section and the remaining sections. Additional definitions to those in this section will be provided as needed. The definitions are as follows:

ESP time series group: A collection of ESP time series that have the common feature that they are for the same segment id, time series id, data type and time step. In other words, the first four components of the ESP file name for each is the same. The only differing component is the extension, which must be CS, HS, or OBS, where CS and HS files are generated by ESP and OBS files are datacard format files.

List of groups: A collection of ESP time series groups.

Command: A batch input that sets a parameter for an ESPADP action. The name of the command is identical to the <token> in the line of the batch input file.

Action: A batch input that instructs ESPADP to produce output of some kind. The name of the action is identical to the token in the line of the batch input file. The values of the line of the batch input file are the action's options.

3.3.5 Batch Commands

This section provides an alphabetical listing of all of the available batch commands. Commands, indicated in **bold**, set parameter values for an ESPADP batch action (see Section 5.4). They do NOT result in output. The <value> within the line of the batch input file that contains the command is usually restricted, depending on that command. Acceptable values will be listed for each command. The following are ESPADP commands:

AccumVar = <value>

Description: Sets the method used to accumulate over a time frame. This command is the "Output Variable" of the "Accumulation Settings" window of the ESPADP GUI.

Acceptable Values: "none", "mean", "max", "min", "ndto", "ndis", "ndmx", "ndmn".

Default Value: "none".

AddCalbFile = <filename>

Description: Add the specified file to the list of groups to be processed by ESPADP when the next action is executed. It must be a datacard format file and the resulting ESP time series group will contain only the data from this one file.

Acceptable Values: a complete file name (including path).

Default Value: N/A.

AddGroup = <base name>,<ext1>,<ext2>,...

Description Add the specified ESP time series group to the list of groups. All of the time series files are assumed to exist within espts_dir at the time the AddGroup command is processed. The value of espts_dir can be set with the ESPTSDir command, described below.

Acceptable Values:

- base name is the first four components of the ESP time series file name (i.e. <segid>.<tsid>.<data type>.<ts>) and
- ext# is an ESP time series file extension to be included in the group. If one of the extensions to include is "CS", it must be listed first.

Default Value: N/A.

Example: "AddGroup = EMYSW.EMYSW.QINE.06,CS,HS" will create an ESP time series group with files EMYSW.EMYSW.QINE.06.CS and EMYSW.EMYSW.QINE.06.HS.

ClearGroups = true

Description: Instruct ESPADP to remove all of the groups from the current list of groups.

Acceptable Values: "true". To turn off the command, the entire ClearGroups line must be removed.

Default Value: N/A.

Distribution = <value>

Description: Set the distribution used in the computation of exceedance fractiles used within the plots and some tables. This command is the "Probability Dist" of the "Frequency Settings" window of the ESPADP GUI.

Acceptable Values: "empirical", "normal", "lognormal", "wakeby", "logweibull", "loglogistic", "weibull".

Default Value: "empirical".

EndDate = <ESPADP date>

Description: Set the end date of the analysis period. This command is the end date within the "Display Window" of the "Accumulation Settings" window of the ESPADP GUI.

Acceptable Values: Any correctly formatted ESPADP date (see Note 1).

Default Value: The end date provided in the header of the current ESP time series file.

ESPTSDir = <directory name>

Description: Set the value of ESPTSDir for the next AddGroup (above) command execution. A change to ESPTSDir only affects commands and actions below it.

Acceptable Values: A complete directory name of a directory that exists.

Default Value: The value of apps-defaults token espts_dir.

ExceedProbDate = <ESPADP Date>

Description: Set the date to be used in the analysis for the production of an exceedance plot. This is the "Exceedance Probability Interval Begin Date" of the "Frequency Settings" window of the ESPADP GUI.

Acceptable Values: Any correctly formatted ESPADP date (see Note 1). It must be between the value of StartDate and EndDate.

Default Value: The value of StartDate (see below).

FloodLevels = <float>,<float>

Description: Set the flood levels (Warning stage, Flood stage) or (Warning flow, Flood flow) to be displayed in the Flood Exceedance Probabilities plot. This is the "Flood Levels

(ascending)” of the “Frequency Settings” window of the ESPADP gui.

Acceptable Values: Any float value.

Default Value: The Warning/Flood Stage values or the Warning/Flood Flow value from the riverstat table in the database. If the Warning/Flood values are missing in the database, -999.00 will be used.

FloodStage = <true or false>

Description: If the value is true, then the flood stage information will be displayed on any plot. This is the "Show Flood Level" menu item of the "Display" menu of the ESPADP GUI.

Acceptable Values: "true" or "false".

Default Value: "false".

Interval = <value>

Description: Set the time step to use for the analysis of the ESP time series. This is the "Interval" of the "Accumulation Settings" window of the ESPADP GUI.

Acceptable Values: "TSInterval" or "nn<type>", where nn is a two digit integer and type is either "hour", "day", "week", "month", or "year". A value of "TSInterval" will set the interval to the time step associated with the ESP time series file being analyzed.

Default Value: "TSInterval".

LowFlowValue = <value>

Description: Set the low flow or stage value.

Acceptable Values: Any float value.

Default Value: None.

LowFlowText = <value>

Description: Set the label of the low flow or stage value.

Acceptable Values: Any text.

Default Value: None.

OutputTZ = <timezone code>

Description: Set the time zone used in the display of ESP time series data. This command is the "Output Display Time Zone" option within the "Environment Settings" of the default settings within ESPADP GUI.

Acceptable Values: "TSTimeZone", "Z", "EST", "EDT", "CST", "CDT", "MST", "MDT", "PST", "PDT", "AST", "ADT", "HST", "HDT", "NST", "NDT" and "INTL". A value of "TSTimeZone" instructs ESPADP to use the time zone associated with the ESP time series file.

Default Value: "TSTimeZone".

ProbLevels = <float>,<float>,...,<float>

Description: Set the probability levels to be displayed in a probability histogram plot. This is the "Exceedance Probability Levels (descending)" of the "Frequency Settings" window of the ESPADP GUI.

Acceptable Values: As above where float is a floating point value less than 1. Up to 10 numbers can be included in the list.

Default Value: "0.75,0.50,0.25".

RatingCurve = <true or false>

Description: If the value is true, then the flood stage information will be displayed on any plot. This is the "Show Rating Curve" menu item of the "Display" menu of the ESPADP GUI.

Acceptable Values: "true" or "false".

Default Value: "false".

StartDate = <ESPADP date>

Description: Set the start date of the analysis period. This command is the start date within the "Display Window" of the "Accumulation Settings" window of the ESPADP GUI.

Acceptable Values: Any correctly formatted ESPADP date (Note 1).

Default Value: The start date provided in the header of the current ESP time series file.

Units = <SI or English>

Description: Set the display units to use. This command is analogous to setting the units within the "Environment Settings" of the default settings within ESPADP.

Acceptable Values: "SI" or "English".

Default Value: "English".

VarType = <value>

Description: Sets the type of variable displayed on the plot. This command is analogous to the "Daily Accum" of the "Accumulation Settings" window of the ESPADP GUI.

Acceptable Values: "none", "inst", "mean", "accum".

Default Value: "none".

YAxis = <log or linear>

Description: Set type of y-axis scale to use. This command is the "Y-axis" menu of the ESPADP GUI.

Acceptable Values: "linear" or "log" (logarithmic).

Default Value: "linear".

YearWeight = <filename>

Description: Set the year-weighting file to use for adjusting the ensemble traces. This command is analogous to selecting a file by clicking on the menu item "Select" within the "YearWeights" menu.

Acceptable Values: A file containing year-weights in an appropriate format, created by hand or created by clicking on the "Adjustments" menu, "Extended Hydromet" submenu and the "CPC Year Weight" menu item. The file can be specified completely, if the first character is a "/", or relative to the directory \$(ens_files)/yr_wgts.

Default Value: N/A.

***Text = "<string>"**

(**NoteText**, **Title1Text**, **Title2Text**, **Title3Text**, **Title4Text**, **YAxisL1Text**, **YAxisL2Text**, **YAxisL3Text**, **YAxisL4Text**, **YAxisR1Text**, **YAxisR2Text**, **XAxisText**)

Description: Set a label on the currently displayed plot. This command is identical to editing the labels by clicking on the "Text Labels..." menu item of the "Display" menu of the ESPADP GUI. Figure 3.1 shows the location of each of the labels in the plots.

Acceptable Values: A string within double quotes. An empty string instructs ESPADP to use the default label. To instruct ESPADP to not print a label, set it to " " (a space inside quotes).

Default Value: Each label has its own default, which can be seen by producing a plot in which the label of interest is NOT set within the batch file or is set to "" (an empty string).

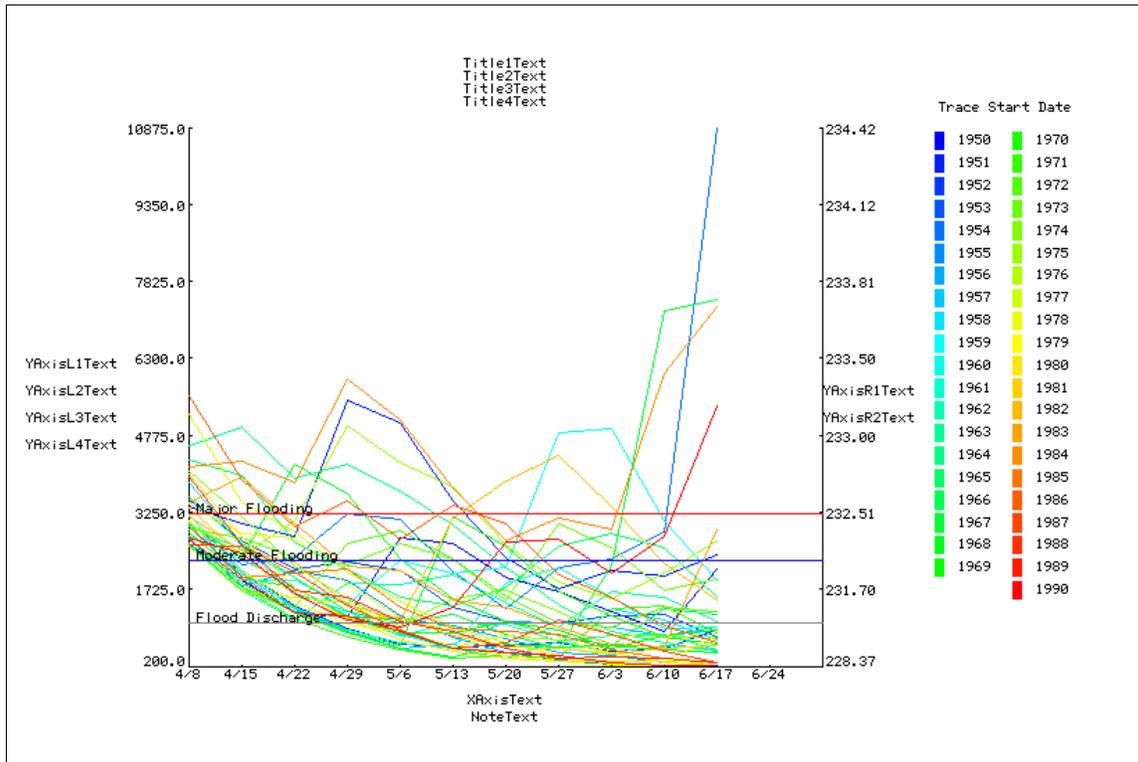


Figure 3.1. ESPADP plot showing position of the labels.

Notes:

1/ There are two ways in which a date can be specified in ESPADP batch mode. The first is explicitly:

`<date command> = mmddyyyy[:hh]`

where mm is a two digit month, dd is a two digit day, yyyy is a four digit year and hh, which is optional (indicated by the brackets), is a two digit hour. The second is relative:

`<date command> = ~+dd[:hh]`

where dd and hh are the same as before. This defines a date relative to the start date associated with the ESP time series file. Examples of each type are "EndDate = 12252002:12" and "~+02".

3.3.6 Batch Actions

Actions, indicated in **bold**, instruct ESPADP to produce some output using the current batch mode command settings. For actions, the value on the batch input line defining the action is a list of options for that action. The list of options is comma separated and must NEVER include spaces. The parameters are given below for each action. The following are ESPADP actions:

NOTE: Each action has an option of output filename. If this option is set to the string value of "<default>", then a default file name is chosen for the output filename.

Plot = <plot type>,<filename>,<file type>

Description: Generate a plot for each group in the list of groups.

Options:

- plot type: Must be one of the following:
 - ▶ "traces" for a plot of the traces,
 - ▶ "expvalue" for an expected value plot,
 - ▶ "exchstgrm" for an exceedance probability histogram plot,
 - ▶ "nonexchstgrm" for a non-exceedance histogram plot,
 - ▶ "excprob" for an exceedance probability plot,
 - ▶ "nonexcprob" for a non-exceedance probability plot.
 - ▶ "excfloat" for a flood exceedance probabilities plot.
- filename: Must be either "<default>", a filename relative to the directory \$(ens_files)/<file type>, or specified completely.
- file type: Must be "gif" for a gif file or "ps" for a post-script file.

Defaults:

- filename: If "<default>" is used for the output filename, then the file name is "<base name>.<file type>", where base name is as described for **AddGroup** in section 3.3.5. The file is placed in \$(ens_files)/<file type>.

PunchDataCard = <filename>[,<float format>]

PunchMeanDataCard = <filename>[,<float format>]

Description: Punch out the time series into a datacard format. If **PunchMeanDataCard** is the action, then it will first compute the daily mean of the time series and then punch it out. Only the FIRST ESP time series of the current ESP time series group will be punched!

Options:

- filename: Must be either "<default>", a filename relative to the directory \$(ens_files)/ascii_ts, or specified completely.
- float format: Must be a floating point Fortran format, such as "6F9.3".

Defaults:

- filename: If "<default>" is used for the output filename, then the file name is "<base name>.<ext1>.txt", where base name and ext1 are as described for **AddGroup** in section 3.3.5. The file is placed in \$(ens_files)/ascii_ts.
- float format: If not specified in the parameters, "6F9.3" is the default.

Table = <table type>,<filename>[,<write/append>]

Description: Produce a table of information for the current group in the list of groups.

Options:

- table type: Must be one of the following:
 - ▶ "quantiles" for an exceedance quantiles table,
 - ▶ "flood quantiles" for a flood quantiles table,
 - ▶ "forecastinfo" for a forecast information table.
- filename: Must be either "<default>", a filename relative to the directory \$(ens_files)/tables, or specified completely.
- write/append: Must be either "write" or "append".

Defaults:

- filename: If "<default>" is used for the output filename, then the filename is "<base name>.<all ext>.tab", where base name is as described for **AddGroup** in section 3.3.5 and all ext is a list of all the extensions associated with the ESP time series groups separated by commas. The file is placed in \$(ens_files)/tables.
- write/append: If not specified, "append" is the Default Value.

3.3.7 Example

Figure 3.2 provides an example of an ESPADP batch file. Figures 3.3 and 3.4 provide the output gif files generated by ESPADP.

```
# 2. Forecast today out to 90 days
StartDate = ~
EndDate = ~+30

# 3. Stup for a weekly interval
Interval = 1week

# 4. We are looking for the maximum flow over the week
VarType = inst
AccumVar = max

# 5. There are no other data items to set.

# 6. Display flood stage and rating curve on plot and set y-axis to
#     linear
FloodStage = true
RatingCurve = true
YAXIS = linear

# 7. Add the groups. Note that no spaces are included in the
#     <value>.
ClearGroups = true
AddGroup = EMYSW.EMYSW.QINE.06,CS,HS
AddGroup = FSMSW.FSMSW.SQIN.06,CS,HS

# 8. Set the texts and fonts for the display
Title1Text ="This is an example plot"

# 9. Generate a probability histogram gif, a quantiles table and
#     punch
#     out the first time series of each group.
PLOT = exceedance,<default>,gif
```

Figure 3.2. Example ESPADP batch input file.

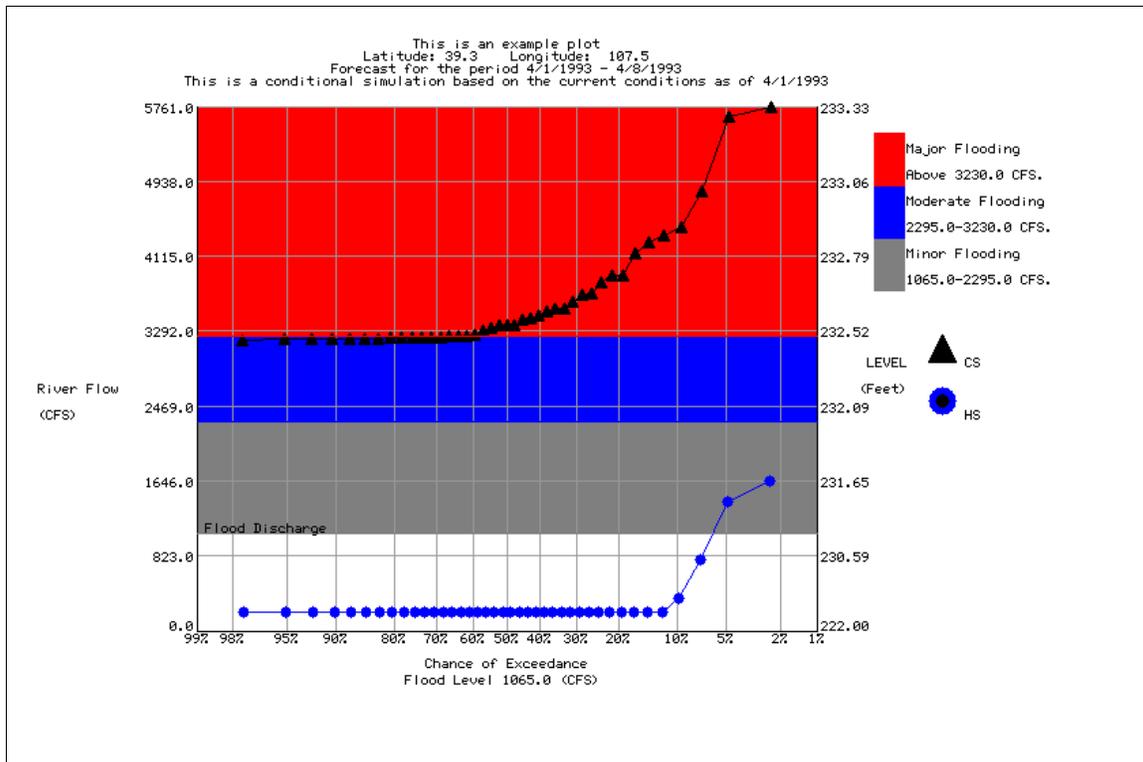


Figure 3.3. Exceedance plot for group EMYSW.EMYSW.QINE.06

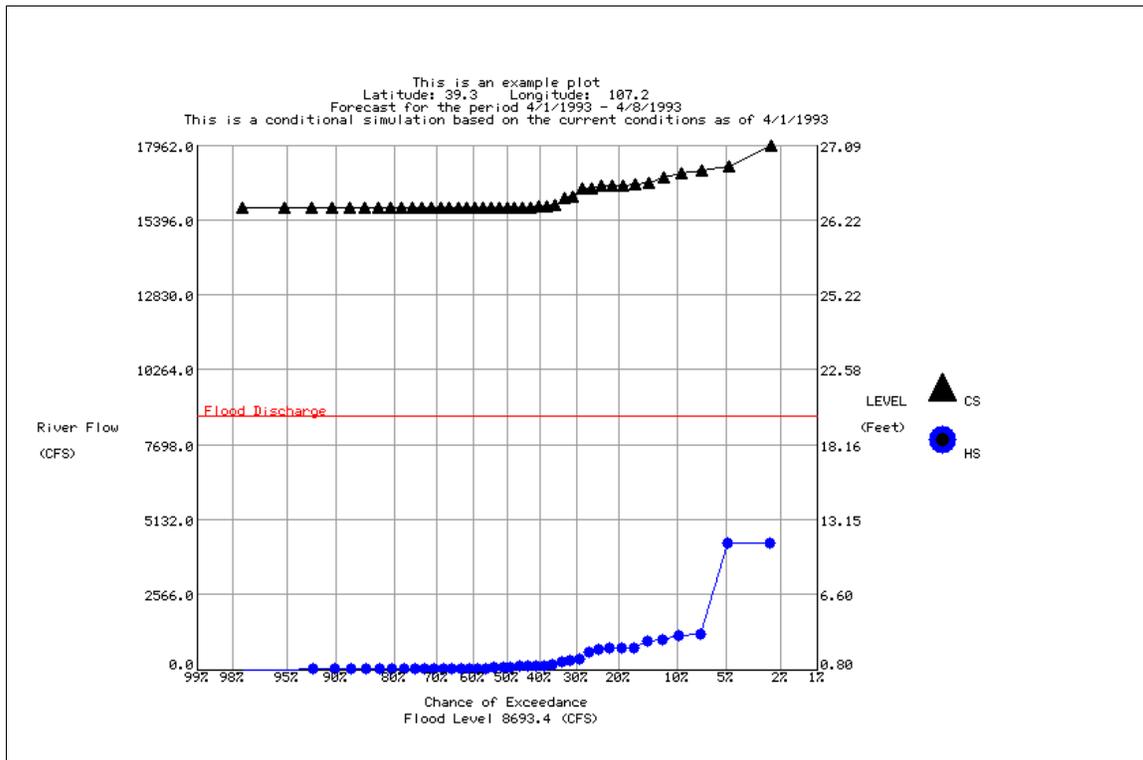


Figure 3.4. Exceedance plot for group FSMSW.FSMSW.SQIN.06